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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/720,693	10/02/1996	DAVID Y. KAO	11675.107	1934

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EXAMINER
FOURSON III, GEORGE R

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 04/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 08/720,693	Applicant(s) KAO ET AL.	
	Examiner George Fourson	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2001* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-4,6-33 and 45-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-4,6-33 and 45-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claims 48,20,26 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 48 depends on claim 1 which has been cancelled. The terms "substantially only at the region exposed to oxygen" and "substantially uniform thickness" in claim 20 are a relative terms which render the claim indefinite. The terms " substantially only at the region exposed to oxygen" and "substantially uniform thickness" " are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. If applicant intends particular profile of the oxidized region it must be clearly recited. In claim 26 it appears that - - the- - should precede "hard mask", "volume", and "substrate assembly" in lines 2 and 3. In claim 28, it appears that - - further - - should precede "etches".

Claim 21 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 21 is contrary to claim 20 because the opening through which the ions are implanted and which is exposed to oxygen would be other than that recited in claim 20 due to the spacer being formed in the "opening".

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 47,45 and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Holland et al.

The profile obtained by Holland et al is seen to be encompassed by the instant claims in part due to the subjectivity associated with use of the terms "substantially only at the region exposed to oxygen" and "substantially uniform thickness" discussed above. Further, the recited profile would be obtained because the same materials are treated in the same manner as in the instant invention.

Claims 47,45,46,11,13,15,16,17,20,26,27,28,30 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Tang et al.

Tang et al discloses a LOCOS process including formation of mask layer 31, disclosed to be suitably nitride/oxide (col.1, lines 20-35 and col.5, lines 50-53), photolithographic patterning of the mask layer including selectively removing both layers with respect to the substrate, implanting silicon ions (col.6, line 59) such that ions are prevented from penetrating under the patterned mask layer wherein the ions damage the crystal structure and increase the oxidation rate of the implanted region (col.5 and col.6) followed by thermal oxidation in an oxygen ambient (col.1).

Claim 14,18,19 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al as applied to claims 47,45,46,11,13,15,16,17,20,26,27,28,30 and 31 above, and further in view of the following comment.

The choice of inclination angle of the implant to achieve a desired implantation profile would have been a matter of routine optimization in view of the teachings at col.6, lines 65+ of Tang et al. Applicant did not seasonably contest the assertion in the office action mailed 10/25/00 that use of conditions recited in claims 18 and 19 was known prior to applicant's invention thus accepting the asserted evidence as prior art.

Claims 6,7,8,9,10,21-25,32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al as applied to claims 47,45,46,20,26,27,28,30 and 31 above, and further in view of Minegishi et al.

Tang et al does not disclose formation of spacers as part of the hard mask formation. Minegishi discloses a LOCOS process including formation of a hard mask by forming a nitride/oxide patterned layer, forming a nitride layer over the patterned layer and anisotropic etching of the nitride layer to form spacers.

It would have been within the scope of one of ordinary skill in the art to combine the teachings of the references to enable formation of the hard mask of Tang et al to be performed and further to obtain the benefits of sidewall formation disclosed by Minegishi (abstract). The choice of size of the openings in the patterned nitride/oxide layers and the thickness of the sidewalls would have been a matter of routine optimization and would depend on the desired device dimensions and device density on the finished wafer.

The choice of inclination angle of the implant to achieve a desired implantation profile would have been a matter of routine optimization in view of the teachings at col.6, lines 65+ of Tang et al.

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al as applied to claims 47,45,46,11,13,15,16,17,20,26,27,28,30 and 31 above, and further in view of Japanese Patent 5-175190.

Tang et al discloses that the B ions are suitable as a material to supply the implanted ions (col.6, line 61). The reference does not specifically disclose implanting more than one type of material. Japan '190 discloses implanting B and Si ions in a LOCOS process. It would have been within the scope of one of ordinary skill in the art to combine the teachings of Tang et al and Japan '190 to enable formation of a LOCOS region free of field inversion as disclosed to be a result by Japan '190.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al as applied to claims 47,45,46,11,13,15,16,17,20,26,27,28,30 and 31 above, and further in view of Japan '028.

Tang et al does not disclose removal of the photoresist after implantation. Japan '028 provides motivation to perform the disclosed steps of Tang et al in the order recited as discussed in the office action mailed 10/25/00.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956. See MPEP 203.08.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner George Fourson whose telephone number is (703) 308-2544. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax number for this group is (703)308-7722(7724,3431 and 3432). MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.

George Fourson
Primary Examiner
Art Unit 2823

GFourson
April 7, 2002